

TWO NEW SPECIES OF BROODFROGS (*PSEUDOPHRYNE*) FROM QUEENSLAND

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Pseudophryne raveni sp.nov. from southeast to mideast Queensland is most similar to *P. coriacea*, with which it probably hybridises. However, it can be readily distinguished by its different advertisement call and colouration. *P. covacevichae* sp.nov. from northeast Queensland is most similar to *P. major* but differs in colour pattern and breeding season. □ *Pseudophryne, raveni, covacevichae, coriacea, major, hybrid, new species, broodfrog, Myobatrachidae, Queensland, Australia.*

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For many years it has been known that there were two sympatric species of *Pseudophryne* in southern Queensland: *P. major* Parker, 1940 was a winter breeder and *P. coriacea* Keferstein, 1868, a summer breeder (Ingram, 1983). However, there is uncertainty in the literature about the identity of the taxon *P. major* and how it differs from *P. bibronii* Günther, 1858 (e.g. Ingram & Corben, 1975; Cogger, 1992; Tyler, 1992). Unfortunately, we do not have the information to address this problem in this paper. From our observations, however, there is little doubt that the taxon presently called *P. major* in southern and central Queensland is a valid species but we are unsure of the southern extent of its range and thus unsure of its correct name. This is because what is called *P. bibronii* in New South Wales is a complex of new and described species. Until the taxonomy of that species is elucidated in southern Australia, the names *P. major* and *P. bibronii* will be doubtfully used. As well, there is a formal, nomenclatural problem with the latter: Cogger et al. (1983) noted that the only surviving specimen of the four syntypes of *P. bibronii* is a *P. guentheri* Boulenger, 1882.

In Queensland, what has been called *P. major* consists of more or less continuous populations in central and southern Queensland and several isolated populations in far northern Queensland (Ingram & Raven, 1991: fig. 101). In this paper we describe the Atherton Tableland population as a new species (*P. covacevichae*) and comment on a record from Cape York Peninsula. Since 1974, we have been aware of two forms of *P. coriacea* in southern Queensland that differ in mating call and colour pattern, and which apparently hybridise. We describe the northern coastal form as a new species, *P. raveni*.

Abbreviations follow Ingram & Corben (1990). Specimens prefixed by 'QMJ', 'AMR' and 'BMNH' are housed in the Queensland, Australian and Natural History Museums respectively. Measurements are in millimetres and ratios are expressed as percentages; those of the holotypes are given in square brackets.

Pseudophryne covacevichae sp.nov. (Fig. 1)

MATERIAL EXAMINED

HOLOTYPE: QMJ52286, Millstream Falls NP, adjacent to park entrance, 5.2km W of Ravenshoe, NEQ (145°22'30"E, 17°38'30"S), K.R. McDonald, M. Davies, G.F. Watson, 27 January, 1991.

PARATYPES: QMJ53870, QMJ53920-32 Ravenshoe, 5km W; AMR104460, AMR104463 Ravenshoe?

DIAGNOSIS

Distinguished from all other *Pseudophryne* by the bright rufous brown to yellow dorsal colouring that forms a connected cap and vertebral stripe, which terminates in a yellow line that inserts into a yellow cloacal patch. Further distinguished from *P. major* (Fig. 1) in breeding behaviour (*P. covacevichae* breeds in spring to summer and *P. major* in winter and autumn).

DESCRIPTION

SV 24-28 (N 17, mean 26.3) [25]; TL/SV: 30-35 (N 17, mean 33.0) [30]; HW/SV: 26-33 (N 17, mean 29.0) [29]; HW/TL: 82-100 (N 17, mean 87.6) [87]; ED/HW: 35-45 (N 17, mean 41.3) [38]; IN/EN: 81-96 (N 17, mean 89.9) [91].

Dorsal ground colour bright rufous brown to yellow with diffuse, black paravertebral lines; thus the frog appears to have a bright cap and vertebral stripe. Cloaca surrounded by a large



FIG. 1. Top left: *P. covacevichae* sp. nov., holotype, QMJ52286, Millstream Falls NP, NEQ. Top right: *P. major* Parker, 1940, Boondall, Brisbane, SEQ. Bottom left: *P. raveni* sp. nov., paratype, QMJ58434, Woogaroo Ck nr Wacol, SEQ. Bottom right: *P. coriacea* Keferstein, 1868, New South Wales.

yellow patch, which extends upwards as a thin, yellow vertebral line connecting with the dorsal ground colour. Sides of body black, sometimes suffused with white or grey. Dorsal surface of upper arm bright yellow. Ventrally boldly marbled in black and white. Upper half of iris yellow to gold in adults.

DISTRIBUTION

Known only from open forest in the Ravenshoe area, NEQ: Millstream Falls National Park and the adjacent Timber Reserve 245, and Ravenshoe dump (K. McDonald & S. Richards, pers. comm.).

REMARKS

P. covacevichae appears to be most similar to *P. major* and, to the ear, the calls are indistinguishable. However, the latter is a winter breeder while *P. covacevichae* breeds in summer. We have not examined the holotype of *P. major* Parker, 1940, but we have studied photographs of it, which are in the possession of Mr Keith Mc-

Donald. From our examination, we concluded that the holotype (listed as BMNH1947.2.20.24 by Cogger et al., 1983), with its uniform ground colour on the dorsal and lateral surfaces of the body ('brown' in Parker, 1940), was a member of the taxon traditionally identified as *P. major* in southern Queensland (e.g. Ingram, 1983; Morley, 1991). We did not examine the specimens of Woodruff (1976), which, at least in part, will be *P. covacevichae*.

In the maps of Ingram & Raven (1991: fig.101), *P. covacevichae* was included with *P. major*. Also included was a record from much further north, on Cape York Peninsula. This record was based on two specimens QMJ12952-3 from Wenlock donated by W.J. Fisher. The material had no date of collection but was registered at the Queensland Museum on 31 July 1951. The record was reluctantly included in Ingram & Raven (1991) because it was suspected that the locality was in error (Ingram, pers. comm.). However, the locality appears to be correct. These specimens were given by Fisher to Donald P. Vernon (then

of the Queensland Museum) while Vernon was on the Archbold Expedition of the American Museum of Natural History in 1948 (Vernon, pers. comm.). The expedition was at the Wenlock during 10-28 July 1948 (Brass, 1953) - Vernon from 24-28th. Vernon further told us that he should have been collecting only birds at the time because Brass (the expedition leader) had forcibly told him earlier (at Mt Tozer) not to collect any other animal groups. However, Vernon had been sent by George Mack, the Director of the Queensland Museum, with specific orders to collect all groups. But, because Vernon was the only Australian and a guest of the Americans, he felt he had little choice but to obey Brass. Even so, he did accept several herpetological specimens from the Fisher family while at Wenlock.

Unfortunately, even though the collection locality appears to be correct, Fisher's *Pseudophryne* specimens are in poor condition and we could not classify them. Any decision about their specific status will have to await the collection of new material. Even so, they are smaller than most individuals of other Queensland species and appear to be adult.

Where exactly Fisher's specimens were collected could be a problem. However, Vernon (pers. comm.) said Fisher ran a mine quite close to the Wenlock River crossing.

ETYMOLOGY

For Ms Jeanette Covacevich. The common name 'Magnificent Broodfrog' is recommended for *P. covacevichae*.

OTHER MATERIAL

P. major: QMJ51359-70, White Mts NP; QMJ50626-9, Collaroy Holding; QMJ49259-60, Croydon Rd, 16.4km from St Lawrence turnoff; QMJ51575-83, QMJ51587-9, St Lawrence turnoff, 16.4km along Croydon Rd; QMJ31787-9, airport clearing, Shoalwater Bay Army Res; QMJ53168-9, QMJ53201-3 Shoalwater Bay Army Res, Wadallah Ck; QMJ53210, Shoalwater Bay Army Res; QMJ10408-9 Mt Etna; QMJ19812, QMJ19823, QMJ19840 Emu Park Rd, c.26km NE of Rockhampton; QMJ43166, Frenchville; QMJ48113-5, North Rockhampton; QMJ42710-2, Curtis Is; QMJ50616-7, Curtis Is, nr Turtle St beach, on rd going inland; QMJ34202-3, halfway up escarpment, Blackdown Tblid; QMJ28506-7, QMJ47648, QMJ50804-6, Blackdown Tblid; QMJ34298, Mimosa Ck, Blackdown Tblid, via Dingo; QMJ50659-61, Blackdown Tblid, rd to Rainbow Falls; QMJ39128-30, QMJ39132-3, QMJ39135, Blackdown Tblid, via Duaringa; QMJ55022, Mt Larcom; QMJ50633-5, Mt Zarnia, c.3km N Springsure; QMJ37759-60, Mt Zarnia;

QMJ55018, Dan Dan SF; QMJ40314, Deepwater Rd, S of Town of 1770; QMJ40110-1, Kroombit Tops, 2nd causeway, Ubobo Rd; QMJ56036, Bunbuncundoo Spring Ka Ka Mundi NP; QMJ53079, Consuela Tblid; QMJ42685-7, QMJ42689, Gin Gin Ck, 4 miles upstream from Gin Gin; QMJ16667, Gin Gin Ck, Gin Gin; QMJ16666, Gin Gin; QMJ55196, Bania SF 54, Monto; QMJ53080-1, Mt Moffat NP, Lethbridge Pocket; QMJ42224-5, Mt Moffat NP, track to Kennifs Lookout; QMJ50601, Carnarvon Gorge, Carnarvon NP; QMJ19818, QMJ19820-1, QMJ19992, 34km S of Bundaberg; QMJ50615, Robinson Gorge NP, gorge bottom; QMJ46031-2, Punchbowl Ck, 25km N of Columboola; QMJ296, Eidsvold, Burnett R; QMJ647, QMJ12646-65, Eidsvold; QMJ18067, 3km W of Gayndah; QMJ18068, Dawson R crossing, Carnarvon Hwy; QMJ55195, Deep Ck, Timber Reserve 581, Biggenden; QMJ19831, c.11km SW of Maryborough; QMJ18070, 13km S of Ban Ban Springs; QMJ40440, QMJ40514, Coeyar; QMJ55467-8, Boogooramunya SF 643; QMJ39193-4, Byanda Stn, 20km NNW of Proston; QMJ18069, 8km W of Goomeri; QMJ40439, Imbil; QMJ103, Buderim Mtn; QMJ50658, Jimna SF, Marumba Ck; QMJ30888, 1km E of The Breadknife, Booloomba Ck, Conondale Ra; QMJ50643, Bellthorpe SF, Conondale Ra, Sandy Ck; QMJ40441, Croamhurst; QMJ42697-8, QMJ42700-9, QMJ42713, c.5 miles E of Rockwood, Condamine-Kogan Rd; QMJ19792, QMJ19833, Bunya Mtns; QMJ40515-6, Killeoy; QMJ19805, 11km N of Caboolture; QMJ40992, Eagers Swp, Moreton Is; QMJ29262, Beachmere; QMJ42519-21, N end of Redcliffe Golf Course; QMJ50607, QMJ50613-4 Crows Nest NP; QMJ19837, QMJ19848, Samsonvale; QMJ21429, Bald Hills, Brisbane; QMJ10405, Boondall, Brisbane; QMJ10499, QMJ10524-5, QMJ10903-4, Samford; QMJ42684, Mt Nebo Rd, Mt Nebo; QMJ12861, Enoggera, Brisbane; QMJ19830, Fernvale; QMJ566, Kelvin Grove, Brisbane; QMJ198, QMJ106, QMJ1503, QMJ2214, QMJ2421, QMJ2424-5, QMJ2435-9, QMJ12667, QMJ12851-2, Brisbane; QMJ42692, West Ithaca Ck, Brisbane; QMJ2444, Toowong, Brisbane; QMJ42681-3, Lake Manchester, just below dam; QMJ19799, QMJ19806-7, QMJ19809, QMJ19836, Lake Manchester Rd, 6km W of Mt Crosby; QMJ56819, Mt Crosby, cnr Wattle & Belah Court; QMJ19808, 6km S of Fernvale; QMJ14473-6, Brookfield, Brisbane; QMJ15903, QMJ19793-8, QMJ19811, QMJ19827, QMJ19832, St Lucia, Brisbane, Munroe St Swamp; QMJ19800-4, QMJ19813, QMJ19819, QMJ19825-6, QMJ19834-5, QMJ19841, Lake Manchester Rd, 3km from Mt Crosby; QMJ42679, Seven Hills State School, Seven Hills, Brisbane; QMJ19814, QMJ19845, Kenmore; QMJ10380-1, Yeerongpilly, Brisbane; QMJ116, Toowoomba; QMJ15911-2, QMJ15914, Moggill Farm, Brisbane; QMJ12791-4, Sunnybank, Brisbane; QMJ42696, Calam Rd, Runcorn; QMJ10434, Runcorn, Brisbane; QMJ42678, QMJ42680, QMJ42688, QMJ42690, QMJ42695, QMJ42699, Kingsley St, Rochedale; QMJ19817, QMJ19822, Grandchester Rd,

SE of Laidley; QMJ19791, QMJ19828-9, Ipswich-Boonah Rd, 6km from New England Hwy junct; QMJ19842, QMJ19844, Flinders Peak Rd; QMJ19815-6, QMJ19838, QMJ19843, QMJ19846, 3km S of Tamborine Village; QMJ42693, Numinbah Valley; QMJ19810, Numinbah Valley Rd 3km past Numinbah Valley T/shup; QMJ42694, Lost World; QMJ42623-4, QMJ50636, Girraween NP, camping ground.

***Pseudophryne raveni* sp.nov.**

(Fig. 1)

MATERIAL EXAMINED

HOLOTYPE: QMJ58433 Woogaroo Ck nr Wacol, SEQ (27°36'S, 152°54'E), Ric Natrass, 20 February, 1994.
 PARATYPES: QMJ56789, Pinnacle, NW of Mackay, Teemburra Dam site; QMJ43850-1, Eungella; QMJ55194, Byfield NP; QMJ55021, Mt Larcom; QMJ55019, Dan Dan SF; QMJ42220, N of Eurimbulah NP, via Miriam Vale; QMJ49439, Agnes Waters Rd, 3 miles W of Agnes Waters; QMJ40176, QMJ41959, Bindaree Stn, 10km ENE of Miriam Vale; QMJ42763-4, Callide Ck, Kroombit Tops; QMJ40141-9, Kroombit Tops, 2nd causeway, Ubobo Rd; QMJ42757, Barracks, Kroombit Tops; QMJ42749, QMJ42751-3, Three Moon Ck, Kroombit Tops, 45km SSW of Calliape; QMJ42158-9, QMJ42186, Kroombit Tops; QMJ42760-2, Lower Dry Ck, Kroombit Tops; QMJ27949, Warro, nr Lowmead; QMJ23855-6, slopes of Mt Warro SF, 16km SW of Lowmead; QMJ30085, Kenfield Farm, Deepwater Ck nr Wreck Rock; QMJ39268, Lake Coomboo, Fraser Is; QMJ18729, 3km W of Childers; QMJ50656, Churchill Mine Rd, 6.5km along rd, from Maryborough; QMJ50655, Hervey Bay road, 12.8km along rd, from Maryborough; QMJ35801-2, Ferguson, via Maryborough; QMJ35803-4, Black Spring, Maaroom, via Bauple; QMJ35805-6, Magnolia, Tuan SF; QMJ23952, QMJ27483, Como Scarp, Cooloola; QMJ42643-51, Cooloola, swamp nr Teewah Ck; QMJ29990-1, Lake Coolamerra, 6.4km W, Cooloola; QMJ42652, Lake Coolamerra, Cooloola NP; QMJ27399-402, Cooloola NP, via Gympie; QMJ18718, 2km S of Pomona; QMJ42677, Noosa R, Harry Springs Hut; QMJ31881, Yabba Stn; QMJ29277, Jiggera Scrub, c.15km N of Jimna; QMJ31886-9, 10km N of Jimna; QMJ32209, Booloumba Ck headwaters, Conondale Ra; QMJ52285, Jimna; QMJ1506, Buderim Mtn; QMJ30882, 1km E of The Breadknife, Booloumba Ck, Conondale Ra; QMJ40443, QMJ40518, QMJ42671 Conondale Ra; QMJ50630, QMJ50637-42, QMJ50644-54, Bellthorpe SF, Conondale Ra, Sandy Ck; QMJ54402-5, Conondale Ra, 30m from Booloumba Falls Car Pk; QMJ35108, QMJ40445-6, QMJ40517, Maleny; QMJ18716, Bruce Hwy, 45km S of Nambour; QMJ29278-9, Kilcoy; QMJ18707, Lake Manchester Rd, 6km W of Mt Crosby; QMJ29259, QMJ29263, Beachmere; QMJ19824, Samford; QMJ18717, QMJ34160-1 Mt Nebo; QMJ42668-9, Mt

Nebo Rd, Mt Nebo; QMJ18699-700, QMJ18702, QMJ18704-5, QMJ18709, QMJ18711-3, QMJ18720-1, QMJ18723, QMJ18725, Mt Glorious Rd, 10km from Stafford; QMJ12304, QMJ12310, The Gap, Brisbane; QMJ1505, QMJ12867, Brisbane; QMJ18719, St Lucia, Brisbane, Munroe St Swamp; QMJ42656, QMJ42660 West Ithaca Ck, Brisbane; QMJ18726, Orchard Tce, St Lucia, Brisbane; QMJ42653-4, QMJ42657, Cleveland Rifle Range, Cleveland; QMJ18708, QMJ18710, Lake Manchester Rd, 3km past Mt Crosby; QMJ37032-3, Rochedale; QMJ42655, QMJ42658-9, QMJ42661-7, QMJ42691, Kingsley St, Rochedale; QMJ30878, QMJ40442, QMJ40444, Mt Cotton; QMJ40214-5, QMJ40258, Stretton, Brisbane; QMJ12385, Acacia Ridge; QMJ2955, Goodna Scrub; QMJ57286, Bellbird Park, Devon Crt; QMJ58434, Woogaroo Ck nr Wacol; QMJ36902, QMJ37470, QMJ37543, Daisy Hill SF; QMJ40519, Mt Tamborine; QMJ18722, Eagle Heights-Palm Grove; QMJ27449, QMJ27451, QMJ27453, Nerang turnoff 1km from Gold Coast Hwy; QMJ50632, Rathdowney.

DIAGNOSIS

Distinguished from other species of *Pseudophryne* by its relatively long, drawn out advertisement call and, except for *P. coriacea*, by its reddish dorsal ground colour. In colouration, *P. raveni* is most similar to *P. coriacea* but, with the latter (Fig. 1), the sides of the body are evenly black, often with bright red to reddish brown patches enclosed by the black (vs black to dark brown dorsolateral stripe with lower lateral surface reddish brown suffused with black or grey).

DESCRIPTION

SV 14-28 (N 141, mean 23.0) [25]; TL/SV: 26-41 (N 141, mean 36.1) [36]; HW/SV: 27-40 (N 141, mean 32.4) [29]; HW/TL: 77-108 (N 141, mean 90.0) [89]; ED/HW: 24-40 (N 141, mean 32.4) [32]; IN/EN: 68- 98 (N 141, mean 83.1) [86].

Dorsal ground colour, red to reddish brown to coppery, sometimes with a blackish tyre-shaped marking, but usually with a broad darker, vertebral stripe. Upper lateral surface of the body, black to dark brown, usually forming a dorsolateral stripe, which may break up into dots towards the hindlegs. Lower lateral surface reddish brown suffused with black or grey. Dorsal surface of upper arm same colour as dorsal ground colour. Ventrally, boldly marbled in black and white. Upper half of iris coppery in adults.

DISTRIBUTION

From near Nerang, SEQ, north to the Eungella Region, W of Mackay, MEQ. *P. raveni* apparent-

ly hybridises with *P. coriacea* around the base of the Scenic Rim, SEQ.

REMARKS

P. raveni is a frog of open forests preferring soaks and springs and not swamps. It breeds during the warmer months from September to March, apparently mutually exclusive with the breeding period of sympatric *P. major*, which is a 'winter' breeder. The advertisement call is a drawn out ratchet sound that speeds up and rises in pitch at the end of the call, finishing sharply. The call of *P. coriacea* is a ratchet sound too. However, it is about a third the duration of *P. raveni*'s call (and does not speed up and rise in pitch) and, to the ear, is indistinguishable from *P. major* and other eastern Australian *Pseudophryne*.

As with sympatric populations of *P. coriacea* and *P. bibronii* in New South Wales (White, 1993), no hybrids of *P. raveni* and *P. major* have been found. However, *P. raveni* apparently intergrades with *P. coriacea* in southeast Queensland. In the one zone of overlap so far discovered (near Nerang, SEQ), combinations of the two call types can be heard. Such zones need further investigation to discover if the two species are actually hybridising. However, we have not located any other areas where the two species overlap: much of their habitat has been cleared for agriculture and housing developments.

ETYMOLOGY

For Dr Robert Raven. The common name 'Copper-backed Broodfrog' is recommended for *P. raveni*.

OTHER MATERIAL

Pseudophryne coriacea: QMJ50606, Crows Nest NP; QMJ42670, QMJ42672-6, Ravensbourne Rd, 15 miles W of Esk; QMJ50608-12, Ravensbourne NP; QMJ42629, Governors Chair, Spicers Gap; QMJ50602-4, Lamington NP, Binna Burra; QMJ50631, Springbrook; QMJ29969-75, QMJ29995-9, Mt Lindesay Hwy, 11.2km N of border; QMJ27442, QMJ27448, QMJ27454, 39km towards Numinbah from Nerang turnoff; QMJ42637-42, Girraween area, Storm King dam Rd; QMJ42626-8, QMJ42630-6, QMJ50605, Girraween NP area; QMJ29984, QMJ29986-8, Murwillumbah, 11.2km S; QMJ27450, Mt Lindesay Hwy, 2km S of border; QMJ29959-63, QMJ29976-9, QMJ29980-2, Mt Lindesay Hwy, 4.8km S of border; QMJ27452, Mt Lindesay Hwy, 13km S of border; QMJ29968, Murwillumbah, 10.4km S; QMJ29983, QMJ22985 Murwillumbah, 11.2km S; QMJ18706, QMJ18714-15, QMJ18727, Lismore Rd, 32km SW of Murwillumbah; QMJ45495, Rosebank,

via Lismore; QMJ18728, Lismore; QMJ29992-4, QMJ27443, QMJ27446, QMJ27490, Ballina; QMJ56814, Tabbimoble SF, SW Ballina; QMJ39222, Gibraltar Ra; QMJ42619-22, Gibraltar Range NP, Mulligans Hut track; QMJ55252-3, Oakwood SF; QMJ55256, QMJ55260 Brother SF; QMJ55254-5, Glen Nevis SF; QMJ28223-4, Cooplacurripa, 25km NW; QMJ46387-401, Pillar Valley, c.25km E of Grafton; QMJ18701, Putty Rd, Colo Heights; QMJ46403-34, Bulahdelah, c.15km S on Pacific Hwy; QMJ56395, Myall Lakes, nr Bulahdelah.

P. raveni × *P. coriacea*?: QMJ27976-91, Nerang turnoff 13km towards Numinbah Valley; QMJ27444, QMJ27457, Nerang turnoff 15km from Gold Coast Hwy; QMJ27445, QMJ27455, Nerang turnoff 16km from Gold Coast Hwy; QMJ29964-7, Nerang turnoff 16.6km from Gold Coast Hwy.

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